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06ME72

Seventh Semester B.E. Degree Examination, Dec.09/Jan.10
Computer Integrated Manufacturing

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting at least TWO questions from each part.*
2. Draw neat sketches wherever necessary.

PART – A

1 a. Define automation. Explain different types of automation systems. **(10 Marks)**

b. The average part produced in a certain batch manufacturing plant must be processed through an average of six machines. There are 20 new batches of parts launched each week. Other pertinent data are as follows.

Average	operation time	= 6 mins
Average	set up time	= 5 hrs
Average	batch size	= 25 parts
Average	non-operation time/batch	= 10 hrs.

There are 18 machines in the plant. The plant operates an average of 70 production hrs/week.

i) Determine the manufacturing lead time for an average part.
ii) Determine the plant capacity
iii) Determine the plant utilization. **(10 Marks)**

2 a. What do you understand by an automated flow line? Explain it with the help of a neat sketch and also list the objectives of automated flow line. **(10 Marks)**

b. Explain the following transfer mechanisms in automated flow the system.
i) Walking beam transfer bar system
ii) Geneva mechanism. **(10 Marks)**

3 a. With examples, explain upper bound and lower bound approaches to analyze automated flow line without storage buffer. **(08 Marks)**

b. The following data applies to a 12 station in-line transfer machine.
P = 0.01 (all stations have an equal probability of failure)
T_c = 0.3 min
T_d = 3 min.
Using upper bound and lower bound approaches, compute the following:
i) Frequency of line stops/cycle
ii) Average production rate
iii) Line efficiency. **(08 Marks)**

c. Explain briefly, partial automation in a flow line. **(04 Marks)**

4 a. Explain the following terms in line balancing:
i) Minimum rational work element
ii) Total work content
iii) Cycle time
iv) Balance delay. **(08 Marks)**

b. The following data gives the precedence relationship and element times for a new product.

Element	te (min)	Immediate predecessor
1	1.0	-
2	0.5	-
3	0.8	1, 2
4	0.3	2
5	1.2	3
6	0.2	3, 4
7	0.5	4
8	1.5	5, 6, 7

Using largest candidate rule method,

i) Construct the precedence diagram for this job

ii) If the ideal cycle time is to be 1.5 min, what is the minimum number of workstations required?

iii) Calculate the balance delay. (12 Marks)

PART – B

5 a. Explain with neat sketches, the in-line and dial (rotary) type of automated assembly systems. (10 Marks)

b. What is an automated guided vehicle system? Explain the principle of working of an AGVS. Also list the applications of AGVS. (10 Marks)

6 a. With a neat sketch, explain retrieval type of CAPP system. (10 Marks)

b. What is material requirement planning? Explain the structure of a MRP system. (10 Marks)

7 a. Explain the salient features of horizontal and vertical axis machining centre and list their applications. (10 Marks)

b. Prepare the manual part program for CNC machining of a slot and holes in a mild steel plate, a shown in Fig.7(b). Assume suitable data for machining parameters and toolings. Indicate the datum and meanings of G and M codes used in the program. (10 Marks)

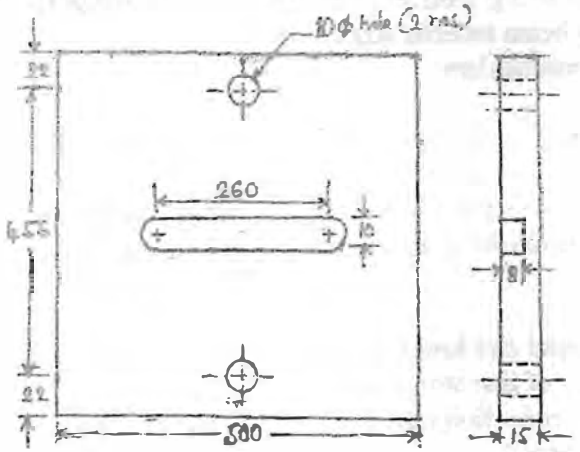

Fig.7(b) All dimensions in mm.

8 a. With neat sketches, explain the four basic configurations of industrial robots. (12 Marks)

b. Describe 'end effectors' and 'sensors' with respect to robots. (08 Marks)

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